

Template Functions

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Opening Discussion

- What did we talk about last class? Do you have questions about the assignment?
- What do you know about templates? What are they? What are they used for? How do we create them?
- Minute Essays
 - Overloading operators with separate functions: how to do this and is it required.
 - Memory allocation: how it works.

Polymorphism

- One of the objectives of both programming languages and good programming styles is to reduce the amount of code that we have to write and maintain. This means we want to be able to reuse code.
- Polymorphism is the ability for a single piece of code to deal with different types.

Parametric Polymorphism

- Today we are talking about the way in which C++ implements what is called parametric polymorphism. This is polymorphism that can work with virtually any type.
- In reality the objects used with parametric polymorphism in C++ must generally satisfy certain constraints, though that is not always the case.

Function Templates in C++

- When we have a function that we want to be able to accept almost any type in C++ we would write it as a templated function. Methods of classes can be templated too.
- Examples of functions that are good for templating are sorts and swaps. Templated functions are often the types of functions that you would find in libraries.

How Function Templates Work

- The template types in a templated function must appear in the argument list of that function. C++ uses that to infer the types in an actual call to the function. This inferences of types can be extremely powerful.
- In C++ a new function is actually created for each unique type combination that is used in code.

C-style Files for I/O

- For binary direct access we will be using C-style files. You get access to these by including `stdio` and you declare pointers to type `FILE`.
- To open a file use `fopen(char *name, char *mode)`.
- To close a file use `fclose(FILE *file)`.
- You can use `man` to get more information on these commands.

Coding Examples

- Now let's code a function or two that are templated. You will do the coding and decide what function you want to code.

Minute Essay

- What questions do you have about templates at this point? I expect that what was talked about today should be largely review for you. Is this true?
- I'll be playing basketball against from noon until 2pm. I should be available after that.
